

OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **PEARLY POND** the program coordinators recommend the following actions. *We would like to recommend to the Pearly Pond volunteers that a sample should be collected in June each year. This early sample allows us to observe any pollutants that may enter the pond through spring runoff.*

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show a *slightly improving* in-lake chlorophyll-a trend. Chlorophyll concentrations were above the NH mean reference line again this season. July results indicate a possible algae bloom for Pearly Pond. Please observe the pond closely in July for signs of a bloom, including visual blooms and odors resulting from a bloom. Contact DES if you suspect a bloom is occurring so that we can sample and determine the species. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are external and internal sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.
- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows a *stable* trend in lake transparency. Water clarity decreased from last season possibly due to the increase in algal concentrations. The mean transparency remains well below the state mean. The natural tea color of the pond contributes to the low clarity readings. The 2000 sampling season was also considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time. These graphs show a *fairly stable* trend for in-lake phosphorus levels. Hypolimnetic phosphorus concentrations in August are questionable since results for the epilimnion and metalimnion were higher, and are abnormally low for the pond. Epilimnetic phosphorus concentrations decreased slightly this season, but remained above the NH mean reference line. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- We are pleased that Pearly Pond used the facilities at the Franklin Pierce College Water Quality Lab in Rindge. This lab was established to reduce the driving time for the VLAP monitors in the southwestern region of the state. The Franklin Pierce lab will ensure the quality of the analyses, since the time spent driving to the lab is much less than the drive to Concord. We encourage the volunteers to continue using this lab next summer for all sampling events. However, don't forget to call the VLAP coordinator at (603) 271-2658 to schedule the annual visit (we missed you this year!). It will be important to have a biologist visually inspect the pond and streams, and also to sample the temperature and dissolved oxygen, as well as the plankton species.
- Conductivity decreased throughout the watershed this year from the high results of last season (Table 6). This was most likely a result of the excess rains we experienced this summer. The increase in rain helped to remove pollutants from the surface waters by increasing the flushing rate, thereby decreasing the accumulation of minerals and salts in the pond. Conductivity increases often indicate the influence of human activities on surface waters. This decrease in conductivity is a positive sign. Septic system leachate, agricultural runoff, iron deposits, and road runoff can each influence conductivity readings.
- Total phosphorus concentrations were quite low for Pearly Pond in the epilimnion during August (Table 8). The low phosphorus concentration helped to reduce algal concentrations to a healthier

level for the pond. Sand dumping, road construction, septic system leachate, and lawn fertilizers can affect phosphorus concentrations.

- There was no dissolved oxygen profile or plankton sample taken this season. These tests are performed on our annual visit, and we hope to be able to gather this information next season. These tests are important in helping us to establish trends in water quality, and to identify potential problems in the pond.

NOTES

- Monitor's Note (8/28/00): No flow Mountain Road Inlet or College Road Inlet

USEFUL RESOURCES

A Guide to Developing and Re-Developing Shoreland Property in New Hampshire: A Blueprint to Help You Live By the Water. North Country RC&D, 1994. (603) 527-2093.

A Brief History of Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

Proper Lawn Care Can Protect Waters, WD-BB-31, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Lake Protection Tips: Some Do's and Don'ts for Maintaining Healthy Lakes, WD-BB-9, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

Effects of Phosphorus on New Hampshire's Lakes, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

Vegetated Phosphorus Buffer Strips, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

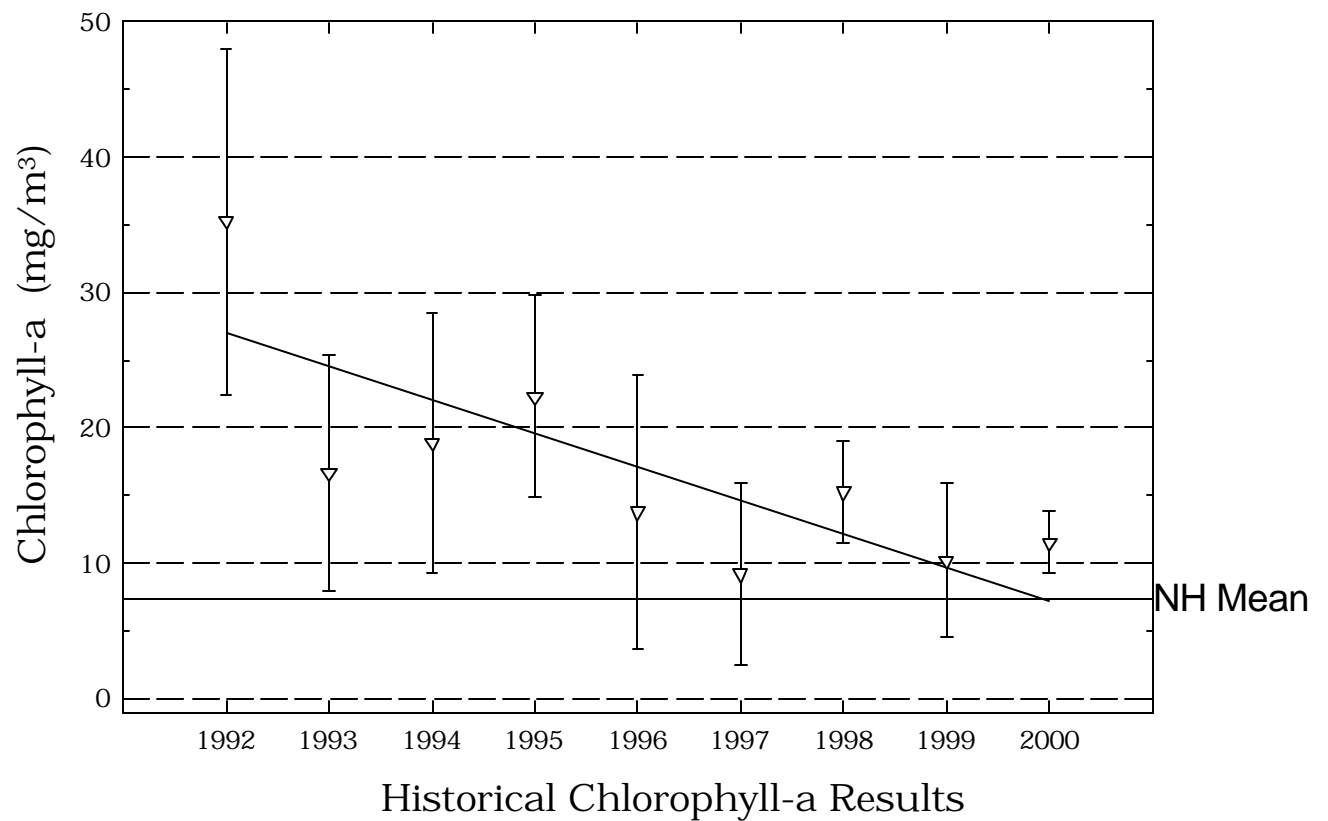
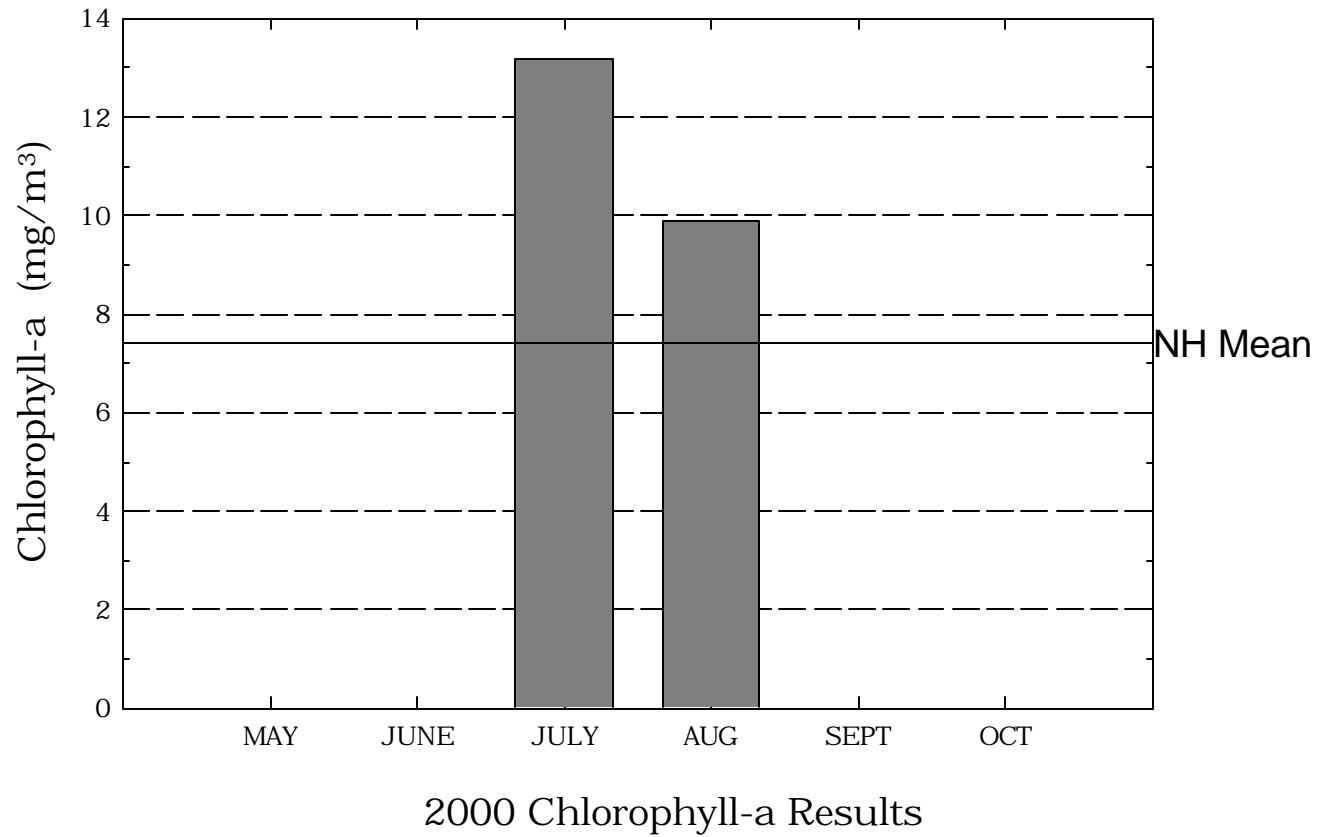
Nonpoint Source Pollution and Stormwater Fact Sheet Package. Terrene Institute. (800) 726-5253, or www.terrene.org

Diet for a Small Lake: A New Yorker's Guide to Lake Management. Federation of Lake Associations, Cazenovia, NY, 1990. (800) 796-FOLA, or www.nysfola.org

Weed Watchers: An Association to Halt the Spread of Exotic Aquatic Plants, WD-BB-4, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

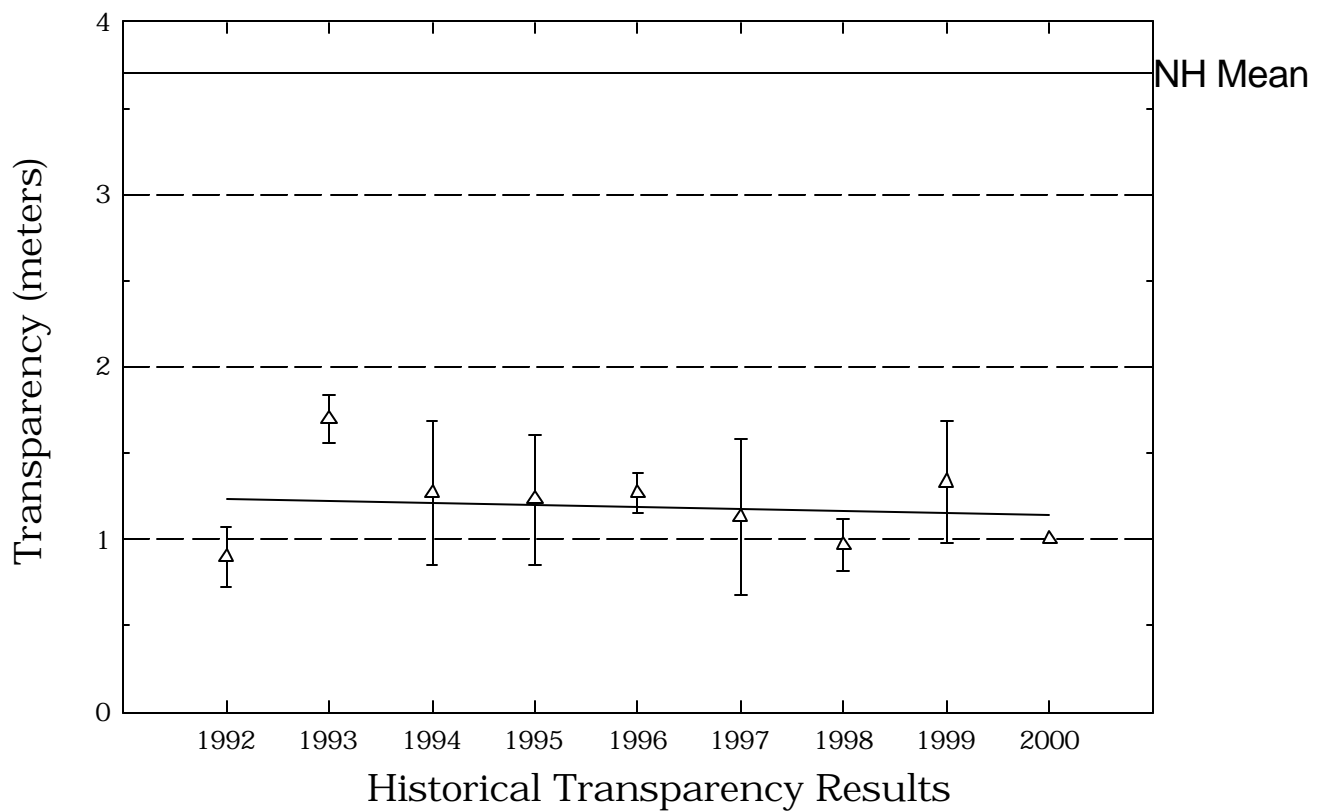
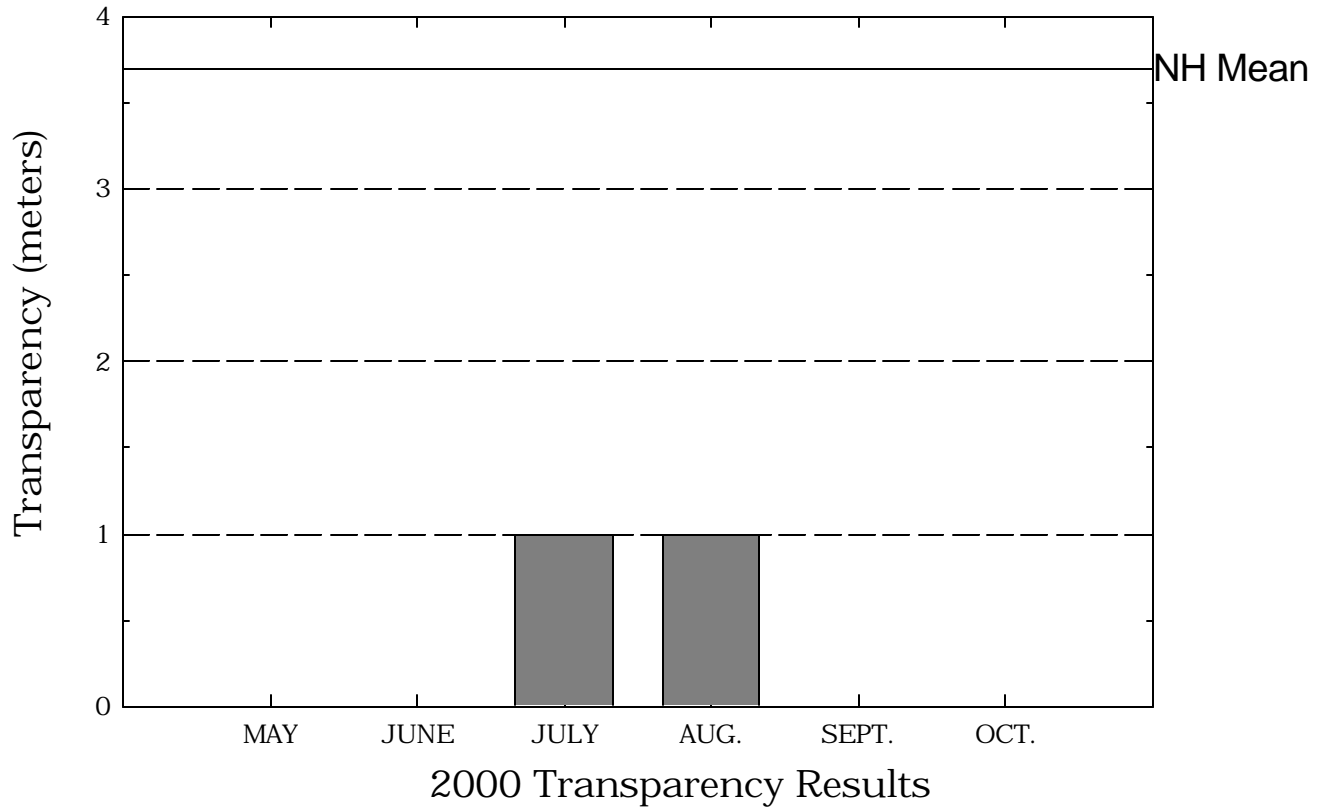
Pearly Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



Pearly Pond

Figure 2. Monthly and Historical Transparency Results



Pearly Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

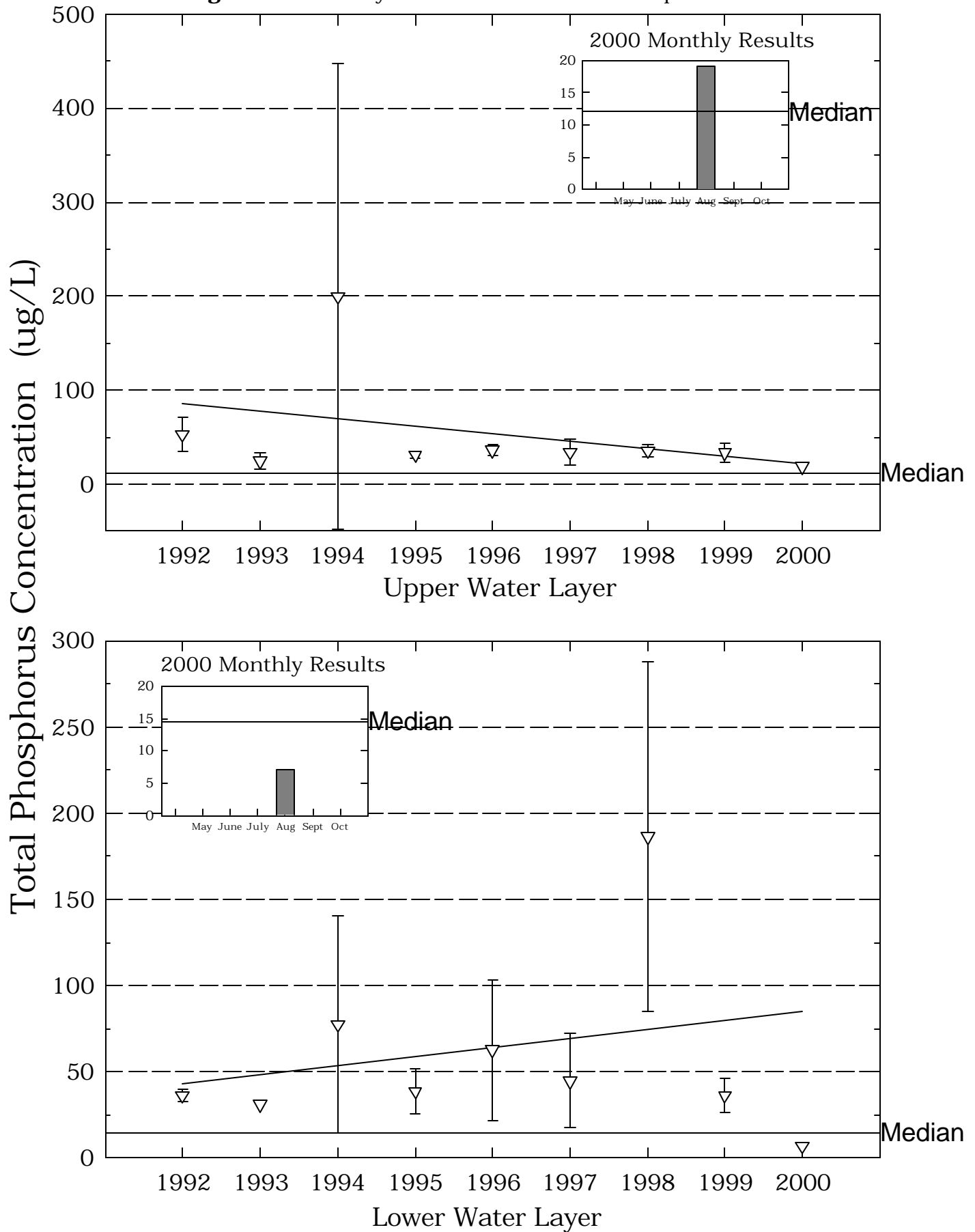


Table 1.**PEARLY POND
RINDGE****Chlorophyll-a results (mg/m³) for current year and historical
sampling periods.**

Year	Minimum	Maximum	Mean
1992	20.52	42.82	35.26
1993	10.54	22.87	16.70
1994	8.03	26.16	18.92
1995	14.93	29.83	22.33
1996	2.10	19.98	13.77
1997	4.55	16.97	9.18
1998	11.14	18.54	15.26
1999	6.33	16.75	10.19
2000	9.90	13.18	11.54

Table 2.**PEARLY POND****RINDGE****Phytoplankton species and relative percent abundance.****Summary for current and historical sampling seasons.**

Date of Sample	Species Observed	Relative % Abundance
06/09/1992	ANABAENA	71
	ASTERIONELLA	29
06/22/1993	ANABAENA	57
	GREEN FILAMENTOUS	18
	CHRYSPHAEERELLA	15
07/13/1994	ANABAENA	94
06/29/1995	ANABAENA	83
	SYNEARA	11
	ASTERIONELLA	4
07/31/1996	TABELLARIA	59
	DINOBRYON	4
	GOMPHOSPHERIA	4
08/25/1997	ANABAENA	98
	STAUSTRUM	1
	ASTERIONELLA	1
07/14/1998	TABELLARIA	38
	ASTERIONELLA	30
	ANABAENA	11
07/14/1999	MOUGEOTIA	37
	ANABAENA	13
	GOMPHOSPHERIA	13

Table 3.**PEARLY POND****RINDGE**

**Summary of current and historical Secchi Disk
transparency results (in meters).**

Year	Minimum	Maximum	Mean
1992	0.7	1.0	0.9
1993	1.6	1.8	1.7
1994	0.8	1.6	1.2
1995	0.8	1.5	1.2
1996	1.2	1.4	1.2
1997	0.7	1.6	1.1
1998	0.8	1.1	0.9
1999	1.0	1.7	1.3
2000	1.0	1.0	1.0

Table 4.**PEARLY POND
RINDGE**

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
ABLE RD INLET				
	1992	5.99	5.99	5.99
ANDERSON INLET				
	1992	4.89	5.07	4.97
	1993	4.77	4.77	4.77
BOWER INLET				
	1998	5.29	5.57	5.41
	1999	5.31	5.81	5.45
	2000	5.25	5.25	5.25
COLLEGE ROAD INLET				
	1993	5.19	5.19	5.19
	1994	4.50	4.96	4.67
EPILIMNION				
	1992	6.07	6.31	6.16
	1993	5.51	5.83	5.64
	1994	6.02	6.25	6.09
	1995	5.95	6.62	6.24
	1996	5.75	6.52	5.90
	1997	6.03	6.58	6.15
	1998	5.72	6.10	5.89
	1999	5.92	6.38	6.08
	2000	5.79	6.16	5.94

Table 4.**PEARLY POND
RINDGE**

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
GOUNDRY INLET				
	1995	6.51	6.51	6.51
HODGE POND TRAIL				
	1994	4.53	5.05	4.72
	1995	5.21	5.21	5.21
HYPOLIMNION				
	1992	5.76	5.95	5.85
	1993	5.73	5.81	5.77
	1994	5.67	6.05	5.86
	1995	5.89	6.03	5.95
	1996	5.72	6.21	5.88
	1997	5.44	6.04	5.72
	1998	5.51	6.09	5.78
	1999	5.44	5.90	5.60
	2000	5.82	5.88	5.85
MAIN RD INLET				
	1994	5.38	5.38	5.38
METALIMNION				
	1994	5.85	5.85	5.85
	1996	5.54	5.84	5.69
	1997	5.65	6.23	5.88
	1998	5.44	6.06	5.59
	1999	5.45	5.88	5.61
	2000	5.64	5.83	5.72

Table 4.**PEARLY POND
RINDGE**

**pH summary for current and historical sampling seasons.
Values in units, listed by station and year.**

Station	Year	Minimum	Maximum	Mean
MOUNTAIN ROAD INLET	1992	5.18	5.33	5.23
	1993	5.90	5.90	5.90
	1994	5.20	5.24	5.22
	1995	5.45	5.74	5.57
	1996	5.28	5.28	5.28
	1997	5.20	5.46	5.31
	1998	5.21	6.09	5.40
	1999	5.40	5.56	5.47
	2000	5.24	5.24	5.24
OUTLET	1992	5.66	6.17	5.87
	1993	4.75	5.60	4.99
	1994	5.74	5.92	5.80
	1995	5.95	6.17	6.07
	1996	5.80	5.94	5.88
	1997	5.73	6.14	5.93
	1998	5.53	6.13	5.74
	1999	5.69	5.76	5.72
	2000	5.70	5.88	5.78

Table 5.

PEARLY POND

RINDGE

Summary of current and historical Acid Neutralizing Capacity.

Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
1992	1.50	3.40	2.23
1993	0.50	1.40	0.95
1994	1.30	2.10	1.57
1995	1.80	14.40	10.20
1996	1.40	2.30	1.93
1997	1.50	2.50	1.90
1998	1.17	3.90	2.49
1999	0.20	2.80	1.57
2000	2.30	2.30	2.30

Table 6.**PEARLY POND****RINDGE**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
ABLE RD INLET				
	1992	96.0	96.0	96.0
ANDERSON INLET				
	1992	66.4	71.5	68.9
	1993	233.1	233.1	233.1
BOWER INLET				
	1998	18.1	20.8	19.4
	1999	20.8	25.1	23.6
	2000	21.3	21.3	21.3
COLLEGE ROAD INLET				
	1993	85.5	85.5	85.5
	1994	60.4	73.5	66.9
EPILIMNION				
	1992	66.7	67.3	66.9
	1993	68.3	71.9	70.1
	1994	71.0	73.7	72.4
	1995	73.1	78.0	75.3
	1996	63.3	66.2	64.4
	1997	66.2	67.5	66.8
	1998	57.5	60.0	58.5
	1999	92.3	96.5	94.3
	2000	74.0	75.6	74.8
GROUNDY INLET				
	1995	36.4	36.4	36.4

Table 6.

**PEARLY POND
RINDGE**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
HODGE POND TRAIL	1994	103.3	166.9	135.1
	1995	93.2	93.2	93.2
HYPOLIMNION	1992	66.8	68.6	67.8
	1993	69.1	72.2	70.6
	1994	72.0	80.1	76.5
	1995	76.2	78.4	77.0
	1996	65.0	76.8	69.3
	1997	66.9	70.6	68.5
	1998	69.3	74.9	71.6
	1999	94.6	97.1	95.4
	2000	82.3	86.1	84.2
MAIN RD INLET	1994	55.3	55.3	55.3
METALIMNION	1994	71.8	71.8	71.8
	1996	62.8	65.8	63.9
	1997	65.4	67.3	66.3
	1998	58.5	68.4	62.2
	1999	93.8	95.4	94.6
	2000	75.2	76.5	75.8
MOUNTAIN ROAD INLET	1992	48.8	64.5	57.9
	1993	86.4	86.4	86.4

Table 6.

**PEARLY POND
RINDGE**

**Specific conductance results from current and historic
sampling seasons. Results in uMhos/cm.**

Station	Year	Minimum	Maximum	Mean
	1994	82.3	117.9	100.1
	1995	57.2	57.3	57.2
	1996	73.8	73.8	73.8
	1997	66.9	98.1	82.5
	1998	48.2	54.3	50.6
	1999	77.5	82.8	80.1
	2000	75.3	75.3	75.3
OUTLET	1992	67.0	67.5	67.2
	1993	69.0	71.0	70.0
	1994	72.2	76.1	73.7
	1995	75.2	78.5	76.4
	1996	63.0	65.5	64.2
	1997	55.8	68.3	61.8
	1998	58.2	59.7	59.0
	1999	95.1	96.6	95.8
	2000	74.4	75.2	74.8

Table 8.**PEARLY POND****RINDGE**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
ABLE RD INLET				
	1992	58	58	58
ANDERSON INLET				
	1992	39	59	49
	1993	38	38	38
BOWER INLET				
	1998	40	48	44
	1999	43	104	63
	2000	47	47	47
COLLEGE ROAD INLET				
	1993	47	47	47
	1994	51	100	73
EPILIMNION				
	1992	41	74	53
	1993	18	31	24
	1994	41	485	199
	1995	28	34	31
	1996	32	43	36
	1997	19	45	34
	1998	29	42	35
	1999	22	39	33
	2000	19	19	19
GOUNDRY INLET				
	1994	22	22	22
	1995	19	19	19

Table 8.**PEARLY POND****RINDGE**

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
HODGE POND TRAIL	1994	65	98	80
	1995	68	68	68
HYPOLIMNION	1992	33	40	36
	1993	31	31	31
	1994	38	150	77
	1995	27	53	38
	1996	32	109	62
	1997	25	76	44
	1998	113	302	186
	1999	29	48	36
	2000	7	7	7
MAIN RD INLET	1994	105	105	105
METALIMNION	1994	27	27	27
	1996	31	45	38
	1997	17	33	27
	1998	27	45	35
	1999	21	29	25
	2000	21	21	21
MOUNTAIN ROAD INLET	1992	55	100	79
	1993	101	101	101

Table 8.

PEARLY POND

RINDGE

**Summary historical and current sampling season Total
Phosphorus data. Results in ug/L.**

Station	Year	Minimum	Maximum	Mean
	1994	60	138	96
	1995	85	100	92
	1996	41	41	41
	1997	30	68	49
	1998	48	65	56
	1999	69	82	75
OUTLET				
	1992	27	46	39
	1993	19	37	28
	1994	27	46	36
	1995	28	38	33
	1996	34	37	35
	1997	20	40	31
	1998	18	36	27
	1999	23	41	32
	2000	22	22	22

Table 11.

**PEARLY POND
RINDGE**

**Summary of current year and historic turbidity sampling.
Results in NTU's.**

Station	Year	Minimum	Maximum	Mean
BOWER INLET	1998	0.5	2.9	1.7
	1999	1.0	1.9	1.3
	2000	1.1	1.1	1.1
EPILIMNION	1997	0.6	4.9	2.4
	1998	0.8	4.7	2.3
	1999	0.8	3.6	1.9
	2000	1.4	1.8	1.6
HYPOLIMNION	1997	1.8	7.6	4.2
	1998	3.0	9.3	5.5
	1999	1.2	2.9	2.1
	2000	4.3	6.0	5.1
METALIMNION	1997	0.7	5.0	2.5
	1998	0.9	4.8	2.1
	1999	0.7	1.8	1.3
	2000	1.3	3.3	2.3
MOUNTAIN ROAD INLET	1997	0.4	1.1	0.7
	1998	0.4	2.6	1.1
	1999	0.8	1.0	0.9
	2000	0.5	0.5	0.5
OUTLET	1997	0.8	3.4	1.9

Table 11.

**PEARLY POND
RINDGE**

**Summary of current year and historic turbidity sampling.
Results in NTU's.**

Station	Year	Minimum	Maximum	Mean
	1998	0.9	6.3	2.7
	1999	0.6	1.6	1.1
	2000	1.0	1.7	1.4